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| (54) Title: AUDIO DEVICE  |  |  |  |
| (57) Abstract<br><p>The invention described provides a device for the playing of information to a person wearing the device on their anatomy such as on the ear or on a person's article of clothing. The device is an integral self-contained which requires no further parts to be attached thereto to allow the playing of information and listening thereto. The device can contain means for receiving information carrying signals and/or means for playing back information held on an information storage media and means for generating the signal to the wearer through a speaker provided in the device which can be positioned adjacent the wearer's ear.</p> |  |  |  |
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Audio Device

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This invention relates to a device which is to be worn and is provided for receiving and/or carrying information media and relaying the same to the wearer of the device via at least one speaker provided in the device. Typically the device is of a dimension such that the user of the device is able to carry the device on their person, preferably, but not exclusively, attached around the ear with the speaker or speakers positioned adjacent and facing the ear for improved listening quality. References to "information" in relation to this application should be understood to relate to any sound which can be reproduced through a speaker and includes any of, for example, forms of music, speech for information and/or entertainment, travel information, tour information, advertising.

At present several devices exist which can be carried on the ears and head and have mounted therein a speaker to which signals are sent by means of wires connecting the speaker to a radio receiver which is either carried separately on the person or said receiver is part of another object completely. This is typically the case with personal stereos where the speakers are mounted on the ears and the receiver is mounted on, for example, the persons belt. It is found that the necessary connecting cable between the receiver and the speakers can be inconvenient and that this restricts the uses to which the device can be put. These disadvantages are equally applicable when the device includes prerecorded media playback means such as portable compact disc or tape players wherein the apparatus as a whole is relatively bulky and inconvenient.

In another use radio devices are commonly used for communication purposes such as by officers of the emergency services however once again the officer is required to carry on their person a receiver which can be linked by cable to an earpiece mounted in the officer's ear. This can be inconvenient to the officer and also represents an impediment to the ease of movement of the officer which is of course important should they be trying to deal with a disturbance.

The third aspect of the known art are headphones which have mounted therein a radio receiver which is linked to a speaker mounted in each earpiece of the headphone. Typically said headphones are extremely cumbersome. These devices are impractical to use, require various moving and interlinked parts and are cumbersome and uncomfortable to wear and are therefore unattractive to use.

The aim of the present invention is to provide a device which is self contained, can be worn or carried on the person and which incorporates therein a speaker and a signal receiver and/or preprogrammed or recorded playback means so that the device is self contained and therefore no connection is necessary by cables or other peripheral devices between various units. The device will therefore be easy to use, be unobtrusive and be attractive to the user.

The present invention provides a sound reproduction device to be worn on the person said device characterised in that it includes, as an integral part thereof, at least one speaker, a power source, a location means for locating the device on the persons anatomy, and any, or any combination of, an information carrying signal receiving means, and/or a prerecorded or preprogrammed information playback means.

In one embodiment the location means are in the form of a pliable length of material, such as wire, which depends outwardly from the body of the device to define a closed or open aperture between the location means and the device body. Reference hereonin to a closed or open aperture should be taken to describe an aperture which is either closed in that the edge of the same is wholly defined by a continuous edge between the location means and the body of the device, or the aperture is open in that part of the location means and/or body is cut or removed to leave a gap around the edge of the aperture.

In a preferred embodiment the device is provided with a location means formed by a shaped mounting rim which defines a closed or open aperture between the rim and the device body. Typically the aperture is shaped to allow a portion of a persons ear to pass therethrough and thereby allow the device to be mounted on the ear. Preferably the mounting rim is formed as an integral part of the device and provided as an integral part of a moulded plastics body. Preferably the device mounting rim is shaped so as to allow the device to be worn on either ear with the speaker of the device facing inwardly toward the ear.

The device also preferably includes control means for the control of the switching on or off of the device and the volume of the information reproduced through the speaker. If the device includes means for receiving information carrying signals then selection controls can be provided for selecting the receiver to receive the appropriate type of signal and also tuning controls to allow the signal to be received clearly. If preprogrammed or prerecorded information playback means are provided then controls means can be provided for starting, stopping and fast forwarding or reviewing the information.

In one aspect of the invention the device is provided with signal receiving means and when this is the case the device can include equipment to allow improved reception of the information carrying signals.

In one embodiment the device is provided with a receiver to receive any or all of FM, AM and Short wave radio signals. In one embodiment the device is set to receive only one frequency of radio waves such that the device is provided for a specific purpose such as, for example, reception dedicated to a single frequency, reception of commentary on a sports event, reception of guide or tourist or tour attractions.

Typically said device consists of a receiver, a power supply, at least one speaker, signal tuning means and a volume control means, all of said functions contained within the device.

In an alternative embodiment the information carrying signal can be transmitted via any electromagnetic waves, ultrasonic or any other transmitted or projected communication method.

In a further aspect of the invention the device includes means for the playback of information which is provided in a preprogrammed or prerecorded format.

In one format the prerecorded information is held on a continuous loop tape or the information is translated into a digitised, compressed form and held in a memory located in the device. In this form the device can be provided with predetermined information therein and the use of the device is therefore predetermined for a particular purpose.

Typically the prerecorded or preprogrammed information is stored on a media storage means which is provided as an

integral part of the device or can be inserted into or placed onto the device. Typically the information held therein can be recalled on demand by a control circuit within the device and fed to an audio amplifier which drives the speaker of the device.

In one embodiment the prerecorded or preprogrammed information includes at intervals during the information, codes or tones which are designed to automatically stop the playback of the information at that point and act to split the information into segments. The playback is then recommenced by activation of a start control button. Alternatively, the stopping and/or starting of the information can be controlled by signals received from remote stations. For example, the device can be triggered as the person wearing the device passes an object or building which includes a means for generating a trigger signal, and the information held in the particular segment of information in the device relates to the object or building from which the signal emanates. This embodiment is of particular relevance for use by persons on tours who may be walking or travelling along designated routes or for persons in museums or galleries walking past objects in the same.

In a further embodiment the device is switched on automatically when connection is made between the power means and the control circuit and the information playback continues until the power means is exhausted.

In a further aspect of the invention there is provided a device which includes therein a recording means such that information can be recorded or programmed onto blank information recording means which are held on or are insertable into the device or alternatively the device is provided with means to allow the same to be connected to a

remote recording means which, when connected, allows the information held in the device to be removed and replaced with new information input from the recording means.

This aspect allows operators who may operate a plurality of such devices on their premises, such as tour guides or museum owners, to change the information to be played on the devices as the surroundings or tour routes or exhibitions change. Thus in one embodiment the operator can give out one, returnable or non-returnable, device to each person who enters their premises or wishes to go on the tour.

In one embodiment the prerecorded and/or preprogrammed information is held in memory on a card or disc or in or on a removable part of the device or in or on a shaped detachable appendage. The device is then equipped to playback the memory through direct or inductive connections.

In an alternative embodiment the information is held on a small tape cassette or disc and the device includes playback heads for location with the cassette in the device and playback for information as the cassette or disc is driven.

Typically the power supply is provided by the use of either disposable or rechargeable cell or battery mounted in the device.

The device can be used for individual pleasure offering the opportunity to listen to information with a minimum of discomfort and annoyance due to the small size of the device. In other possible uses the device can be used by the police force to receive information. Furthermore the device can be used at corporate events, to provide translating facilities or to provide information at museums or other similar areas through closed circuit systems. As the device, when worn,



does not actually enter the outer ear, it is found that the device is generally acceptable for wear even to persons who dislike the common headphones. Furthermore the relatively loose fitting allows persons wearing the device to still hear extrenal sounds, such as conversations or traffic clearly and without distortion.

Preferably the device is self contained and requires no external connections, cables or aerials to be fitted thereto nor is the device required to be connected to any external units.

Specific embodiments of the invention will now be described with reference to the accompanying drawings wherein;

Figure 1 shows a perspective view of a first embodiment of the device;

Figures 2A and 2B show an elevation and a side view of a second embodiment of the device;

Figures 3A and 3B show several of the components which form part of the device;

Figures 4A and 4B illustrate the device including information carrying signal receiving means;

Figures 5A, 5B, 5C and 5D illustrate the device including means for the playing of prerecorded or preprogrammed information;

Figure 6. illustrate a control diagram for a device incorporating a memory in which preprogrammed material is retained.

Referring firstly to Figure 1 there is illustrated a first embodiment of the device of the invention wherein said device comprises a mounting means 4 formed of wire attached at each end to the device body 6 which contains therein the components of the device and of which the speaker 8 is shown. The device is shown in a position fitted on an ear 10 shown in broken lines and shows the way in which the speaker 8 is disposed so that it lies adjacent the ear 10.

Figures 2A and 2B illustrates a second embodiment of the device 2 wherein the device body 6 has an integral mounting rim 14 which defines a shaped aperture 15 between the rim 14 and the main part 17 of the body 6. The mounting rim 14 adjacent the aperture is designed to fit behind the ear rim and also, if comfortable, the earlobe. The main part 17 of the body 6 contains the information playback and/or receiving components and the speaker 8 and is provided with a plurality of apertures 8' to allow the sound emitted from the speaker 8 in the body to be more clearly heard. Figure 2B shows a side view of the device 2 and illustrates that the mounting rim 14 is offset to the rear of the main part 17 of the body 6 such that when the device is worn on the ear the rim and lobe of the ear pass through the aperture 15 between the mounting rim 14 and main part 17 of the body 6 and serves to hold the device 2 and in particular the speaker apertures 8' in comfortable location adjacent the aural cavity of the ear. Typically the body 6 is a single piece moulded plastic article.

Figure 3A illustrates the standard electrical components which are held within the main part 17 of the device body 6. Firstly there is provided a speaker 8 which is mounted adjacent the apertures 8' in the body 6. There is also provided a power cell 20 in the form of a disposable or rechargeable cell or battery which provides the power to the

components when the device is switched on. A printed circuit board 22 is provided which includes the control circuit for the device and which is activated by the connection of at least one switch 24 which can be activated by the wearer of the device by pressing an appropriate control button 26, part of which protrudes outside the device body 6. Figure 3B illustrates a cross sectional end elevation through the device which illustrates the components of Figure 3A in position in the main part 17 of the device 2. The device also includes a cap portion 28 which fits over and encloses the components and forms the externally viewable face of the device when the same is worn. In various embodiments the cap portion can be provided with advertising material which can, for example, be linked to the provider of the device.

Figures 4A and 4B illustrate a device 2 which includes an information carrying signal receiver therein and control means therefore. The receiver can be a standard receiver for any of one particular signal, a range of signals of one particular type such as short wave, FM or medium wave signals or may be a receiver which is designed to receive one particular type of electromagnetic wave, ultrasonic or any other transmitted or projected communication method. The choice of receiver is dependent upon the use to which the device is to be put and the requirements of the provider of the devices and the persons using the device. In the embodiment shown the device includes a radio signal receiver and in this embodiment four control buttons 26a, 26b, 26c and 26d are provided. Control button 26a allows the device power to be switched on and off and therefore is required to be pressed to activate the device. Control button 26b allows the particular type of radio signal to be received to be selected and therefore is the next button pressed and then control button 26c is pressed to select a particular frequency of the radio signal to be received. Preferably the

device is provided with a memory whereby certain frequencies can be memorised and obtained by repeated pressing of button 26c. The button 26d is provided to allow the volume of the information played through the speaker 8 to be controlled by the user. It should be appreciated that not all of the control buttons 26a-26d are required in all embodiments of the device including a receiver. In many embodiments, to reduce the operating requirements, set frequency reception, set signal reception and indeed set volumes of play can be provided.

Figures 5A -5D illustrate a device 2 which incorporates a means for the reception of an information carrying media 30 which in this case is a card, and means for playing back the prerecorded or preprogrammed information held on the media 30 when the same is inserted into or onto the device. The device 2 includes control means 26 which in this case can include any of an on/off button, a play button, rewind and/or fast forward buttons and/or volume control buttons. The device includes an aperture 32 into which the information carrying media 30 is inserted and this is illustrated in Figure 5B. In this position the media can then be operated to allow the playback of the information held thereon. One form of information carrying media 30 is shown in Figure 5C wherein a card 36 is shown which comprises a main portion 38 which is insertable into the aperture 32 in the device 2 and a tab portion 40 to allow the card 36 to be inserted and removed into and from the device 2. The main portion 38 includes therein a memory 42 in which the preprogrammed information is held. To allow the information to be played back following insertion of the card 36 into the device 2, a series of contacts depend upwardly from the chip on the card such that when the card is inserted into the aperture 32 in the device 2 they contact contacts 48 which are shown in Figure 5D which is a sectional elevation of the main part 17

of the body 6 of the device. The contacts are provided in the device adjacent the aperture 32 and hence contact is made whereupon the information on the device 42 can be played and listened to by the wearer via the speaker 8.

In the embodiment of Figures 5A-5D the information carrying media is a card 36 but it should be understood that any information carrying media such as a continuous tape, a cassette tape, a disc or any other media could be used and the device 2 includes the necessary mechanical and electrical connections to allow the information to be played back upon activation through the speaker 8 and listened to by the wearer of the device.

In a yet further embodiment preprogrammed information is held in a memory device which is permanently located in the device 2 and Figure 6 illustrates the various components which are incorporated in this embodiment wherein the same includes a memory device 50 which is linked to a control circuit 52, which in turn is linked to a power cell 20 and control buttons 56. When activated by depression of the control buttons the control circuit links the memory held information to be played back through the audio amplifier 58 and then the speaker 8 by which the wearer of the device can hear the information.

To operate the device, in whichever embodiment, the user switches on the power to the device and can then attach the device around their ear or, by means of another attachment (not shown) attaches the device to an item of their clothing or another part of the anatomy such as the finger or wrist.

The user can, if suitable controls and means are provided in their particular device, select the channel and frequency of information carrying signals they wish to receive and/or

insert an information carrying media into or onto the device and commence playback of the information held thereon and adjust the volume to suit. The user can continue to wear and listen to the device without the inconvenience of cable connections nor have the inconvenience of carrying two items which have to be connected and which limit the movement of the user.

The device is therefore extremely advantageous in that the device can play to the user information which can be any of, for example, radio programmes, travel information, tour information, advertisements or any other type of messages or information while remaining unobtrusive and the said device is an integral self contained unit which has no major moving parts and can easily be stored and can be worn without inconvenience to the user nor to other persons in the vicinity of the user.

## CLAIMS

1. A sound reproduction device to be worn on the person said device characterised in that it includes, as an integral part thereof, at least one speaker, a power source, a location means for locating the device on the persons anatomy, and any, or any combination, of an information carrying signal receiving means, and/or a prerecorded or preprogrammed information playback means.

2. A device according to claim 1 characterised in that the location means are in the form of a pliable length of material which depends outwardly from the body of the device to define an open or closed aperture between the location means and the device body.

3. A device according to claim 1 characterised in that the location means is in the form of a shaped mounting rim which defines an open or closed aperture between the rim and the device body.

4. Apparatus according to claim 3 characterised in that the open or closed aperture is shaped to allow a portion of a persons ear to pass therethrough and thereby allow the device to be mounted on the ear.

5. A device according to claim 4 characterised in that the mounting rim is shaped to allow the device to be worn on either ear with the speaker facing towards the ear.

6. A device according to claim 3 characterised in that the mounting rim is formed as an integral part of the device body.

7. A device according to any of the preceeding claims

characterised in that the device includes control means for the selective control of the playing of information from the device.

8. A device according to claim 7 characterised in that the control means are provided for any, or any combination, of switching on or off of the device, controlling the volume of the information through the speaker, controls for selecting the appropriate type of signal to be received, tuning controls to allow the signal to be received and controls for starting, stopping and fast forwarding or reviewing prerecorded or preprogrammed information.

9. A device according to any of the preceding claims characterised in that the device acts as a signal receiving means and includes a receiver for receiving information carrying signals.

10. A device according to any of the preceding claims characterised in that the device is provided with a receiver to receive any or any combination of FM, AM and Short wave radio signals.

11. A device according to claim 10 characterised in that the device is set to receive a set frequency of radio waves such that the device is provided for a specific designated purpose.

12. Apparatus according to any of the preceding claims characterised in that the device is provided with a receiver to receive information carrying signals transmitted via electromagnetic wave, ultrasonic or any other transmitted or projected information communications method.

13. A device according to any preceding claim characterised



in that the device is provided with means to playback prerecorded information held on an information storage media.

14. A device according to claim 13 characterised in that the information storage media is any of a continuous loop tape, cassette, disc or a card containing a memory.

15. A device according to claim 14 characterised in that the device has a reception means into which the information carrying media can be placed to allow playback of the information through the device.

16. A device according to claim 13 characterised in that the information storage media is in memory located in or on the device and the information is translated into a digitised, compressed form and held in the memory.

17. A device according to claim 16 characterised in that the information held for playback on the device is predetermined.

18. A device according to any of claims 13 to 17 characterised in that the information held on the information storage media can be recalled on demand by a control circuit within the device and fed to an audio amplifier which drives the speaker of the device.

19. A device according to any of claims 13-18 characterised in that the prerecorded or preprogrammed information includes at intervals at least one code or tone which is designed to automatically stop the playback of the information at that point and split the stored information into segments.

20. A device according to any of claims 13 -18 characterised in that playback of prerecorded or preprogrammed information can be controlled by the receipt of signals remote from the

device.

21. A device according to claim 20 characterised in that the signals are emitted from signal emitters provided in objects or buildings as the wearer of the device comes into proximity with the same.

22. A device according to any of the claims 13-18 characterised in that the playback of information commences when connection is made between the power means and the control circuit and the information playback continues until the power source is exhausted.

23. A device according to claim 1 characterised in that the device includes a recording means such that information can be recorded or programmed onto blank information storage media which is held in or is insertable into or onto the device.

24. A device according to claim 23 characterised in that the information can be recorded onto the device storage media from a central recording station.

24. A device according to any of the preceding claims characterised in that the power source is either a disposable or rechargeable cell or battery mounted in or on the device.

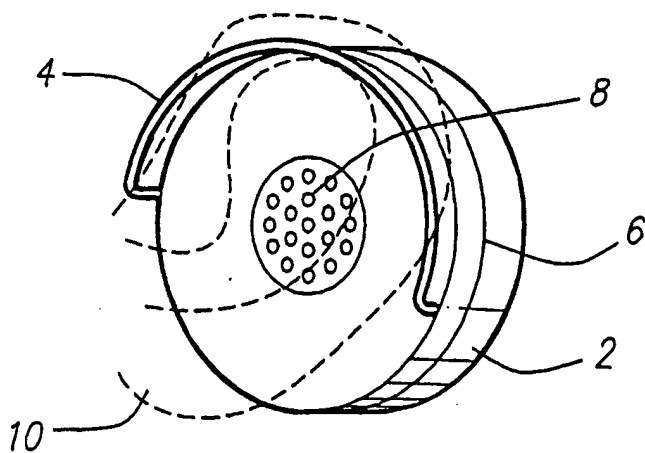


FIG.1

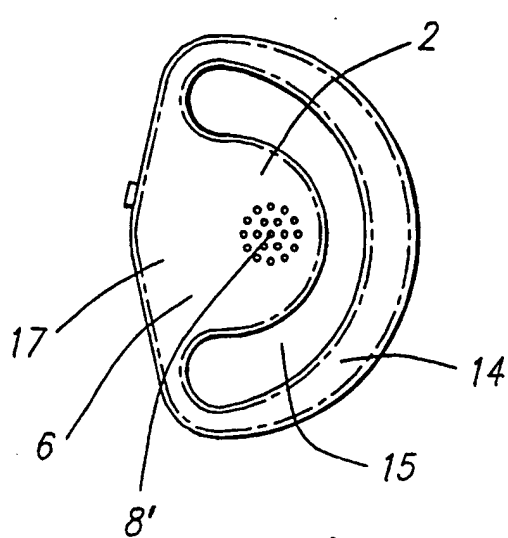


FIG.2A

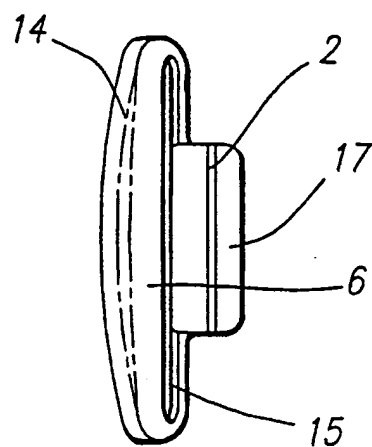


FIG.2B

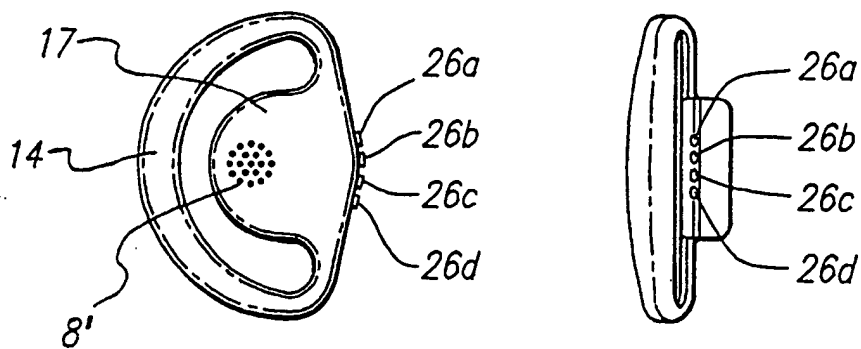
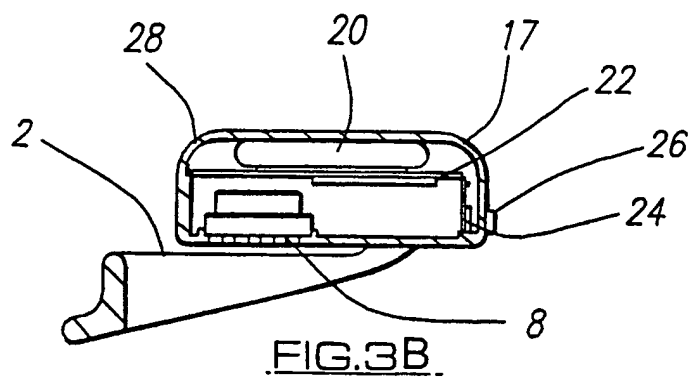
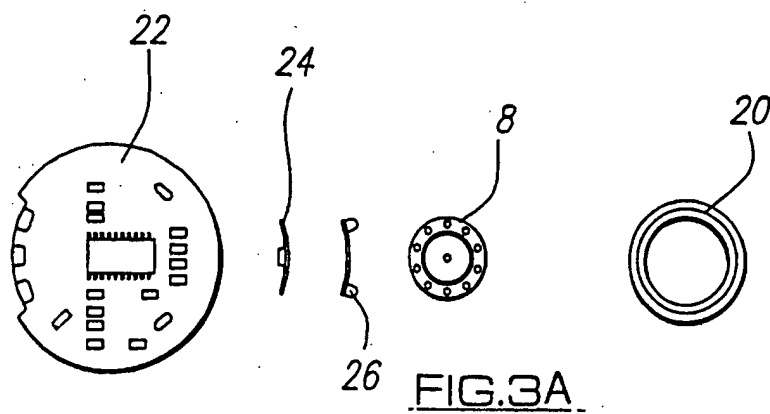


FIG. 4A

FIG. 4B

FIG.5A

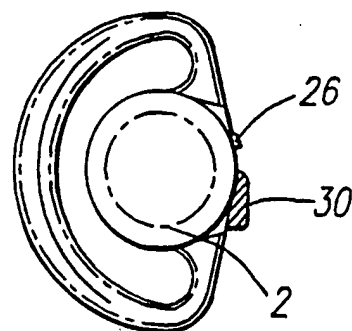
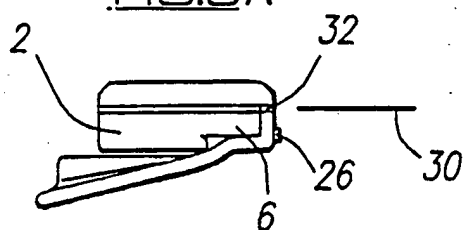


FIG.5B

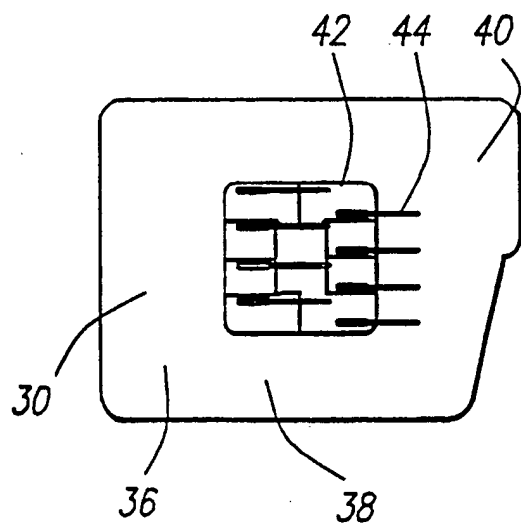


FIG.5C

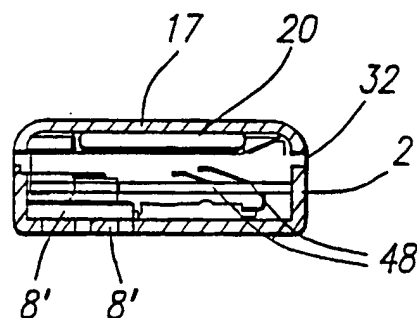


FIG.5D

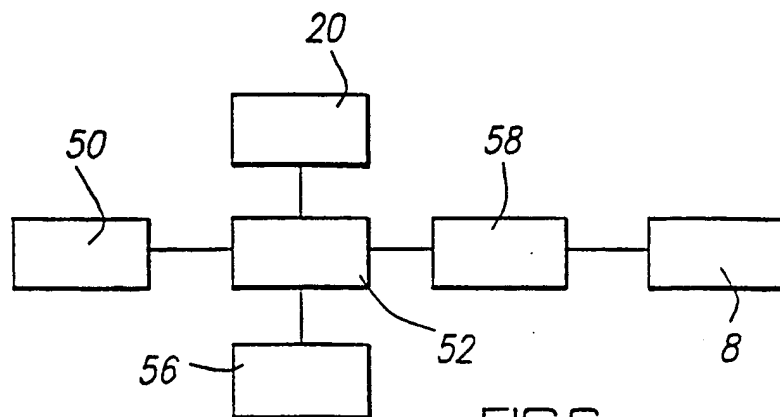


FIG.6

# INTERNATIONAL SEARCH REPORT

In tional Application No

PCT/GB 95/00615

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 H04R5/033 H04R1/10 H04B1/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04R H04B H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No.                  |
|------------|---|--|
| Y          | US,A,5 146 619 (BROWN) 8 September 1992   | 1-15,17,<br>18,20,<br>21,24,25<br>8,22 |
| A          | see column 3, line 33 - column 5, line 26<br>---  |  |
| Y          | WO,A,90 00844 (PARIENTI) 25 January 1990  | 1-7,<br>9-15,17,<br>18,20,<br>21,24,25 |
| A          | see page 1, line 1-22<br>see page 1, line 30 - page 7, line 21<br>---   | 8,16,19,<br>22,23                      |
| Y          | PATENT ABSTRACTS OF JAPAN<br>vol. 14 no. 297 (E-945) ,27 June 1990<br>& JP,A,20 094899 (HITACHI) 5 April 1990,<br>see abstract<br>--- | 1-15,17,<br>18<br>22,25                |
| A          | ---   |  |

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☒ Further documents are listed in the continuation of box C.

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# INTERNATIONAL SEARCH REPORT

In International Application No  
PCT/GB 95/00615

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
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| A          | <p>US,A,4 319 089 (MILLER) 9 March 1982</p> <p>see column 1, line 6-9<br/> see column 1, line 52 - column 2, line 29<br/> see column 2, line 45 - column 3, line 8<br/> see column 3, line 18-41<br/> see column 4, line 22-63<br/> see column 5, line 34-62</p> <p>---</p> | <p>1,8,19,<br/>23</p> |
| A          | <p>EP,A,0 271 094 (MOTOROLA) 15 June 1988</p> <p>see column 2, line 18-45<br/> see column 3, line 31 - column 5, line 33<br/> see column 8, line 42 - column 9, line 6</p> <p>-----</p>   | <p>1,16</p>           |

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

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| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
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